

Friedenwald (Jul.)

ATONY OF THE STOMACH.

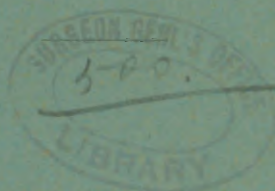
BY

JULIUS FRIEDENWALD, A.B., M.D.,

OF BALTIMORE;

ATTENDING PHYSICIAN, MEDICAL DEPARTMENT, CITY HOSPITAL DISPENSARY;

VISITING PHYSICIAN, BAY VIEW HOSPITAL, BALTIMORE.



FROM

THE MEDICAL NEWS,

December 23, 1893.

[Reprinted from THE MEDICAL NEWS, December 23, 1893.]

ATONY OF THE STOMACH.¹

BY JULIUS FRIEDENWALD, A.B., M.D.,
OF BALTIMORE;

ATTENDING PHYSICIAN, MEDICAL DEPARTMENT, CITY HOSPITAL DISPENSARY; VISITING PHYSICIAN, BAY VIEW HOSPITAL, BALTIMORE.

ATONY of the stomach is that condition in which the muscular walls have lost their tonicity, with a resultant motor insufficiency, in consequence of which the stomach is unable to pass its contents into the intestine at the normal rate. Although this condition has long been recognized, it has not received sufficient study, and great confusion still exists concerning its significance. By some authors it is classified as a purely nervous disorder; by others as a form of gastrectasia; some pass it by in a cursory manner.

Kussmaul² was among the first to make a distinction between atony and dilatation. He showed that in gastrectasia due to stenosis of the pylorus or of the duodenum, vomiting is very frequent during the entire course of the disease, and is a characteristic sign, while in atony it rarely occurs. Oser³ attempts to distinguish between dilatation and atony, and

¹ Read at the semi-annual meeting of the Medical and Surgical Faculty of Maryland (Annapolis), November 23, 1893.

² Kussmaul: "Peristaltische Unruhe des Magens," Volkmann's klinische Vorträge, 1880, No. 181.

³ Oser: Ursachen der Magenerweiterung, Wiener Klinik, 1881.



states that in actual dilatations lavage is of great benefit, but that in atony it is of little service. Naunyn¹ lays stress on fermentation in dilatation of the stomach, and shows that in muscular insufficiency fermentation is usually produced. Minor forms without fermentation, he believes, should be excluded from the chapter of true gastrectasia. Germain Sée² likewise distinguishes clinically between dilatation and atony. Von Pfungen³ has published a monograph devoted to this subject. He distinguishes the condition not only from gastric neuroses but also from gastrectasia.

For clearer views concerning this subject we are much indebted to Boas.⁴ In his recent work on *Diseases of the Stomach* he describes this disorder at length, devoting a special chapter to it as a separate pathologic condition. He suggests the name myasthenia (muscle-weakness) as being more appropriate than atony or muscular insufficiency.

As regards causation, atony may be of two kinds—primary and secondary. Primary atony is found in persons who have been in the habit of consuming large quantities of indigestible food; the excessive use of fluids especially predisposes to this disorder; frequently, however, no such cause is assignable.

¹ Naunyn: "Verhältniss der Magengährungen zur mechanischen Insufficienz." Deutsches Archiv für klin. Medicin, Bd. xxxi, 1882, S. 225.

² Sée: "De la Dilatation atonique de l'Estomac," Revue de Médecine, 1884, 529.

³ Von Pfungen: "Atonie des Magens," Klinische Zeit und Streitfragen, Wien, 1887.

⁴ Boas: Specielle Diagnostik und Therapie der Magenkrankheiten, II. Theil, p. 59.

Atony may be secondary to many other diseases, such as those of the brain and cord, typhoid fever, anemia, tuberculosis, and diseases of the gastro-intestinal tract, such as gastroparesis, enteroparesis, chronic gastritis, and nervous dyspepsia. Cholelithiasis is not an infrequent cause (Boas¹). I have found gastric atony of rather frequent occurrence in diabetes. According to Peyer,² it is often found as a neurosis secondary to disease of the generative organs in males. Bamberger³ finds it frequently congenital, and according to Zweifel⁴ it is not uncommon in children, due, as he believes, in many cases to improper feeding. Kundrat⁵ also finds it in children, and especially among those that have been subjected to many attacks of gastro-intestinal catarrh. Pfungen has shown that atony of the stomach often originates during the period of puberty; it is not improbable that the precocious appetite of this age, leading to the consumption of much indigestible food, is the cause of this disturbance. For the same reason it is not uncommon after typhoid fever. Pfungen⁶ relates such a case in a woman in whom atony of the stomach was directly attributable to an

¹ Boas: Loc. cit., p. 59.

² Peyer: Volkmann's Sammlung klinische Vorträge, 1890, No. 356, p. 3173.

³ Bamberger: "Krankheiten d. Chylopoët. Systems." Virchow's Handbuch, Erlangen, 1855, p. 327.

⁴ Zweifel: Untersuchungen über d. Verdauungsapparat der Neugeborenen. Berlin, 1874, p. 47, and Centralblatt für die med. Wissenschaft, 1874, No. 59, p. 939, etc.

⁵ Kundrat: Gerhardt's Handbuch der Kinderkrankheiten, Bd. iv, ii, p. 368.

⁶ Pfungen: Loc. cit., p. 541.

attack of typhoid fever. No age seems to be exempt from the disorder, and it appears with equal frequency in males and females.

As to symptoms, most patients complain of a loss of appetite, though in rare instances the appetite may be fully maintained, at least in the first stages. When the condition is secondary to nervous disorders the appetite may even be increased (Peyer¹). A feeling of pressure or fulness comes on, usually during or after meals, and this is especially marked after the ingestion of fluids. In light forms the distress reaches its height immediately after meals, and gradually passes off during the next hour, to be again aggravated by the smallest amount of food. In severer forms it may be so great as to continue with intensity for hours after meals, and become still more aggravated by the following meal. This feeling of pressure is accompanied by heartburn, pyrosis, eructations of gas, and, rarely, by vomiting. The quality as well as the quantity of the food ingested is productive of the symptom; fluids are most likely to induce pressure. Constipation is almost a constant symptom, and headache of a dull character is frequently present, and may at times lead to actual vertigo. Nervous symptoms of various kinds may be present, such as palpitation of the heart and indefinite pains, and on this account the disorder is frequently mistaken for neurasthenia.

On physical examination the stomach is found to be enlarged, so that the greater curvature reaches

¹ Peyer: Loc. cit., p. 3174.

to, or below, the level of the umbilicus. Peristaltic and anti-peristaltic movements of the walls of the stomach may occasionally become visible. With but small quantities of fluid in the stomach (from 250 to 300 c.c.) a splashing sound may be produced by quick movements of the patient, or by a series of quick shocks with the fingers upon the abdomen. The boundary of the greater curvature of the stomach may be determined by marking the limit of this splashing, and sometimes when the stomach is dislocated downward, the lesser curvature also. The boundary of the greater curvature may likewise be located by percussion; especially is the method of Dehio¹ to be recommended: he allows a quarter of a liter of water to be swallowed, and the position of the greater curvature obtained by the limit of flatness against the tympanitic transverse colon; by drinking more water the curvature sinks until it reaches the umbilicus. In normal conditions it does not reach beyond this line. In atony, however, with but little fluid it sinks quickly below this limit.

Still more reliable is the method by expansion of the stomach with gas, which may be accomplished by the old method of Frerichs. Carbon-dioxid gas is produced by the ingestion of a teaspoonful of sodium bicarbonate dissolved in a small quantity of water, followed quickly by the ingestion of the same quantity of tartaric acid in water. But it is simpler and better to introduce air into the stomach through the stomach-tube by means of an ordinary double bulb of a spray apparatus. On percussion the

¹ Dehio: Zur physic. Diagnostik der mechanischen Insufficienz des Magens. Verhand. d. Kongress f. innere Medicin, 1888.

stomach will be found to reach to, or below, the umbilicus.

In atony, the stomach is not only enlarged, but its motor function is also markedly impaired, and it does not propel its food into the intestine at the normal rate. The propulsive force of the stomach may be measured by the salol test of Ewald and Sievers.¹ Fifteen grains of salol are swallowed during a meal, and the urine is tested for salicyluric acid at half-hour intervals, beginning one-half hour thereafter, and continuing until the response occurs. Usually salicyluric acid appears in the urine in from forty to sixty minutes after ingestion. It is easily recognized by the violet color produced by the addition of a few drops of a solution of neutral ferric chlorid. The modification of this method by Huber² may be employed; according to this the urine is tested for salicyluric acid twenty-four hours after its ingestion, the reaction normally disappearing after this period. In patients suffering with enfeebled motor activity of the stomach, as in cases of atony or gastrectasia, the reaction lasts much longer. Of greater value is the test-dinner of Leube, consisting of a plate of soup (400 c.c.), scraped beef (60 grams), a piece of white bread (50 grams), and a glass of water (200 c.c.). Under normal conditions the stomach will be found empty in from six to seven hours. Should particles of food be still present

¹ Ewald und Sievers: "Zur Pathologie und Therapie der Magenectasien," *Therap. Monatsh.*, August, 1887.

² Huber: "Die Methoden zur Bestimmung der motorischen Thätigkeit des Magens," *Correspondenzbl. für Schweizer Aerzte* 1890.

after this time the motor function of the stomach is much impaired.

A most important test is the condition of the stomach before the ingestion of food (Boas¹). If the contents of the stomach be expressed in the morning before the ingestion of food, the stomach will be found entirely empty and free of all food-remains. This is not so in cases of gastrectasia, in which greater or smaller quantities of food will be found. Boas has devised still another test, which I have found of great service. The test-supper of Boas consists of white bread with butter, cold meat, and a large cup of tea. In atonic conditions the stomach will be empty the next morning, but in gastrectasia it still contains food-remains at that time.

The examination of the gastric contents is of great importance. The expression one hour after an Ewald test-breakfast² shows large quantities of solid contents, not separating into the characteristic three-layered fluid of gastrectasia,³ or containing yeast-spores or sarcinæ.

Upon chemic examination the contents show in most cases a normal proportion of hydrochloric acid, pepsin, and casein ferments. According to Boas,⁴ at the very beginning of atony of the stomach, through constant mechanic irritation of the food

¹ Boas: Loc. cit., p. 68.

² The Ewald test-breakfast consists of an ordinary dry roll and 300 c.c. of water.

³ An upper brown foam, a yellowish middle layer, and a lower dark slimy layer containing food-particles; bubbles of carbon dioxide can be constantly seen rising to the top.

⁴ Boas: Loc. cit., p. 66.

upon the walls of the stomach, an increased acid-production results; in fact the irritation may be so great that even hypersecretion may be produced. A case of this kind has come under my observation. In other cases there may be a condition of subacidity.

The symptoms of atony of the stomach are well illustrated by the following two cases:

CASE I.—F. B., barkeeper, thirty-eight years of age, with a good family history, had malaria three years ago, and since then has enjoyed good health. Some months ago the patient was taken "with heaviness in the stomach after eating." The heaviness was soon followed by a sense of severe pressure and fulness after meals. Loss of appetite, nausea, headache, and constipation were also marked. Vomiting has never been present. This disorder has gradually increased in severity, until small quantities of fluids now cause great pressure and inconvenience. The man is rather badly nourished, his mucous membranes are pale, the pulse weak, the tongue coated. The heart and lungs are normal, and the liver and spleen are not enlarged. The stomach is tender to pressure along the line of the linea alba, from the ensiform cartilage to the umbilicus. The greater curvature of the stomach is four centimeters below the umbilicus. By quick shocks a splashing sound can be elicited at this point. Upon swallowing a very small quantity of fluid the splashing becomes much more distinct. By inflation of the stomach with air the lesser curvature is found in normal position, while the greater curvature is four centimeters below the umbilicus. The salol-test shows marked retardation of the motion of the stomach. Seven hours after a Leube test-dinner the stomach still contains large quantities of food.

Several examinations of the contents of the stomach before the ingestion of food in the morning show no remains of food. This is likewise the case when a Boas test-supper has been taken the previous evening.

The examination of the gastric contents one hour after an Ewald test-breakfast shows large quantities of food remaining, with an acidity of 70; free hydrochloric acid, 0.17 per cent., and no lactic acid. The urine is normal in quantity, containing neither sugar nor albumin.

CASE II.—M. W., a colored washerwoman, twenty-three years of age, a widow, with a good family history, had smallpox when a child, and has since been in good health. Fifteen months ago the patient was seized, directly after meals, with a sense of pressure in the stomach. This was especially severe after dinner; water and fluids are badly borne, and always cause inconvenience. The appetite is usually bad, but at times is increased. Constipation has existed for years.

The patient is a well-nourished woman; the pulse is strong; the tongue coated; the heart and lungs normal; the liver and spleen not palpable. The right kidney is palpable and dislocated to the second degree. The stomach is not tender to pressure. After swallowing but 200 c.c. of water a marked splashing sound can be produced in the region of the stomach, the limit of which is found three finger-breadths below the umbilicus; this is verified by the inflation of air. The stomach is found empty in the morning, Boas' test-supper having been taken the evening before. The examination of the gastric contents after an Ewald breakfast shows large quantities of solid contents, with an acidity of 58, HCl 0.19 per cent. The urine is normal in quantity, and contains neither sugar nor albumin.

Among the frequent complications of atony may be mentioned dislocation of the stomach (gastrop-tosis), and also of the bowel (enteroptosis), and dislocation of the right kidney. The association of dislocation of the kidney with dilatation of the stomach has been pointed out by Bartels,¹ Müller-Warnecke,² and Litten.³ Litten endeavored to demonstrate that dilatation of the stomach may cause the liver to move downward, carrying with it the right kidney. This explanation is accepted by but few. Nothnagel⁴ claims that Litten's cases were for the most part cases of atony; though dislocation of the right kidney is quite commonly associated with atony, he maintained that this association is merely a coincidence. It is probable that the atony in these cases is secondary to a gastrop-tosis. The following case illustrates this condition.

CASE III.—L. O., white, female servant, thirty-two years of age, single, came to the dispensary for treatment. She had been healthy when a child, but for years had suffered with constipation. Four months ago she had taken a large dose of "salts" on two successive nights; for several days this was followed by severe diarrhea, which was checked by medicine, but leaving a great sense of pressure in the region of the stomach, nausea, and heaviness in the epigastrium after eating. These symptoms have

¹ Bartels: Schmidt's Jahrb., Bd. clviii, p. 225.

² Warnecke: Berl. klinische Wochenschrift, 1877, No. 30, p. 49.

³ Litten: Verhand. des Kongr. für innere Med., vi, 1887, p. 223.

⁴ Nothnagel: Verhand. des Kongr. für innere Med., vi, 1887, p. 242.

been very severe ever since; in the intervals between meals this pressure gradually passes away. In moving in bed at night the patient has noticed a splashing sound in the stomach.

The patient is of small stature, rather anemic, the pulse weak, the heart and lungs normal, the liver and spleen not palpable, the right kidney dislocated; points of tenderness are noted along the linea alba from the ensiform cartilage to the umbilicus; the region of the spleen is also tender to pressure; upon quick shocks with the fingers a splashing sound is heard at a distance of five finger breadths above and six finger-breadths below the umbilicus. On inflation with air the smaller curvature of the stomach is found five finger-breadths above the umbilicus, and the greater curvature six finger-breadths below. Seven hours after a Leube test dinner the stomach is found to contain large quantities of food-remains. It does not, however, contain particles of food early in the morning before the ingestion of nourishment; one hour after an Ewald test-breakfast large quantities of solid contents are, however, expressed. The acidity is 60; HCl 0.1 per cent., without lactic acid.

On inflating the colon with air it is found dislocated downward, the upper border of the transverse colon being two finger-breadths below the umbilicus. The urine contains neither sugar nor albumin, and is normal in quantity.

Atony of the intestine is not an infrequent concomitant of atony of the stomach—indeed, both may be present for years, and it may be difficult to tell which is the primary trouble. Of twenty cases of atony of the bowel recently examined by me, fourteen were complicated with atony of the stomach.

Gastric vertigo, the vertigo dyspeptica of Trousseau,¹ which this writer believed to be caused by chronic gastritis, probably depends in most cases upon atony (Boas). I have had a case of this kind under observation for some time.

CASE IV.—M. L., thirty-two years of age, a laborer, of good family history, had been in good health until ten years ago, but since then has had gastric trouble. He has had nausea, headache, great pressure after eating, and constipation. Recently the headache has frequently passed into vertigo, which at times becomes so intense that the man is unable to stand. These attacks of vertigo appear at irregular intervals, days sometimes passing by without them. The patient has become very nervous. The man is a large, well-developed individual, with strong pulse; the tongue is coated; the heart and lungs are normal; the liver and spleen are not palpable; the right kidney is dislocated (second degree); the stomach is tender along the median line from the ensiform cartilage to the umbilicus; a splashing sound reaches a hand's breadth beneath the umbilicus, which marks the location of the greater curvature, as was verified by the inflation of air. The stomach contains large quantities of food—remains one hour after the test-breakfast of Ewald. Acidity 62; HCl 0.149 per cent. The urine is clear, containing neither sugar, albumin, nor casts.

Atony of the stomach must be differentiated from nervous dyspepsia and gastrectasia or (dilatation).

According to Bamberger,² the variability and rapid change of symptoms, the presence of other

¹ Trousseau: "Vertigo dyspeptica," *Gaz. des Hôpitaux*, 1862.

² Bamberger: "Krankh. der Chylopoët. Systems," *Virchow's Handbuch*, Bd. vii, 1, 1855, p. 270.

nervous symptoms, the normal and increased appetite, and the absence and rapid disappearance of the gastric disturbance, distinguish nervous dyspepsia from atony. At times a diagnosis becomes very difficult and sometimes impossible. It must not be forgotten that atony is frequently a complication of most nervous disorders.

From gastrectasia, atony is diagnosticated by the absence of food-remains from the stomach in the morning before the ingestion of food ; by the absence of the three layered fluid of gastrectasia, and by the absence of sarcinæ and yeast-spores. There is a marked diminution in the secretion of urine in gastrectasia, but not in atony.

Atony of the stomach is a chronic disorder, and may last for years. It is quite amenable to treatment, and, though the disorder may not be perfectly cured, the patient may be relieved of all suffering. Atony may pass into gastrectasia after years, but this is rather a rare occurrence. Boas¹ has observed but a dozen of such cases.

The treatment of myasthenia depends in general upon its cause. If it is secondary, the treatment must be directed to the primary disorder. The dietetic treatment is highly important. It is necessary that the quantity of fluid taken shall be very small. According to Boas not more than from one to one and a half liters of fluid should be taken daily, though in general larger quantities of milk are contra-indicated ; in some cases this food is well borne and proves serviceable. The examination of the

¹ Boas : loc. cit., p. 67.

acidity of the gastric contents gives us indications for the regulation of the diet. If superacidity exists a meat-diet in general is indicated. To this can be added soft-boiled eggs, with but few vegetables. Butter should be allowed in small quantities. In cases of subacidity the more digestible forms of meat should be allowed in smaller quantities. The vegetable diet may be increased in these cases.

In the treatment of the chronic constipation which accompanies most of these cases, my experience coincides with that of Boas. The use of cathartics is in most cases to be deprecated. The method that I carry out, and that I have seen practised with much success in the polyclinic practice of Dr. Boas,¹ is the proper regulation of the diet. Such substances are given as foods as stimulate the peristalsis of the intestine; for this purpose, Graham bread, fruits, and vegetables are ordered in rather large quantities; to these is added milk sugar, which may be used twice daily in teaspoonful doses to sweeten coffee or milk, and which thus acts as a purgative.

In other cases of constipation, when the treatment just described proves ineffectual, injections of various kinds may prove beneficial. In three cases I have had excellent results from the use of the oil injections recently recommended by Fleiner.²

In atony of the stomach, Boas³ highly disap-

¹ Boas: Loc. cit., p. 73.

² Fleiner: "Ueber die Behandlung der Constipation und einige Dickdarmaffectionen mit grossen Oelklystieren," Berlin. klin. Wochenschrift, Nos. 3, 4, January 16 and 23. 1893.

³ Boas: Loc. cit., p. 75.

proves of the use of lavage. He considers fermentation and decomposition the only indications for this procedure; and inasmuch as these are entirely absent in this disorder, lavage is quite superfluous. In regard to this disorder at least, I am convinced of the truth of this statement.

In two cases in which I have practised this form of treatment, not only was no relief obtained, but the pressure was more marked and persistent than before the treatment was undertaken. Of greater benefit is the use of the stomach-douche, especially in those cases depending upon the various gastric neuroses. Still more beneficial is the use of electricity which may be applied either extra-ventricularly or intra-ventricularly by means of Einhorn's electrode. The best results are obtained by the intra-ventricular method.¹ The tonicity of the muscular walls of the stomach are influenced by the faradic current. Painful conditions are alleviated by the galvanic current, the kathode being used intra-ventricularly, the anode placed upon the fundus of the stomach. To this may be added massage of the abdomen, the effect of which is to increase the peristalsis of the intestine and to strengthen the abdominal walls.

In regard to the medicinal treatment, preparations of strychnin seem to serve the best purpose. Either strychnin sulfate or the extract of *nux vomica* may be given in pill-form. To allay the feeling of pressure, which is a constant and annoying symptom, the

¹ Einhorn: Deutsche med. Wochenschrift, August, 1893, Nos. 34, 35.

extract of belladonna may be prescribed. When there is a diminished secretion of hydrochloric acid, fifteen-drop doses of dilute hydrochloric acid, given, according to the method of Ewald,¹ several times after meals, is indicated.

In cases of increased acidity, sodium bicarbonate should be ordered after meals. Pfungen recommends this remedy very highly.

¹ Ewald: *Klinik der Verdauungskrankheiten*, Berlin, 1893, ii, p. 221.



The Medical News.

Established in 1843.

A WEEKLY MEDICAL NEWSPAPER.

Subscription, \$4.00 per Annum.

The American Journal

OF THE

Medical Sciences.

Established in 1820

A MONTHLY MEDICAL MAGAZINE.

Subscription, \$4.00 per Annum.

COMMUTATION RATE, \$7.50 PER ANNUM.

LEA BROTHERS & CO.

PHILADELPHIA.